T.P. N° 3 — Vectores

2. $u = \overline{ab}$

a) $a(2,3)$ $b(1,3)$

$u = (1-2\,;\, 3-3) = (-1,0)$ $\quad \|u\| = \sqrt{(-1)^2+(0)^2} = 1$

b) $a(0,-1,1)$ $b(1,-2,1)$

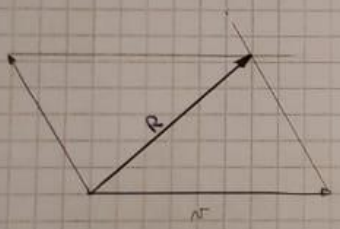
$u = (1-0\,;\, -2+1\,;\, 1-1) = (1,-1,0)$

$\|u\| = \sqrt{(1)^2+(-1)^2+(0)^2} = \sqrt{2}$

$u_0 = \left(\frac{1}{\sqrt{2}}\,;\, \frac{-1}{\sqrt{2}}\,;\, 0\right)$

3. $\|u\| = 30$ $\quad \|v\| = 45$ $\quad \alpha = 120°$

1 cm — 10



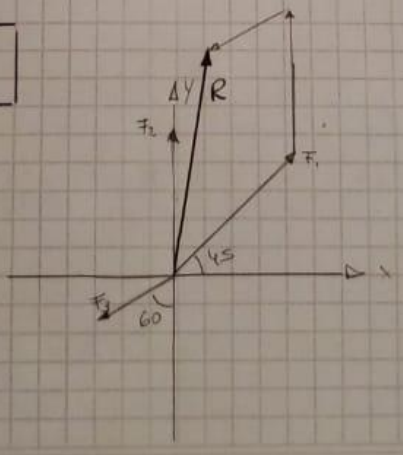
$|R| = \sqrt{(30)^2+(45)^2+2.30.45\ \cos 120°}$

$\|R\| = 39,68$

1 cm — 10

3,9 cm — X = 39

4.



1 cm — 10

4 cm — 40

NOTA

$F_{1x} = 30 \cdot \cos 45° = 21,21$ $\quad F_{1y} = 30 \operatorname{sen} 45° = 21,21$

$F_{2x} = 25 \cos 90° = 0$ $\quad F_{2y} = 25 \operatorname{sen} 90° = 25$

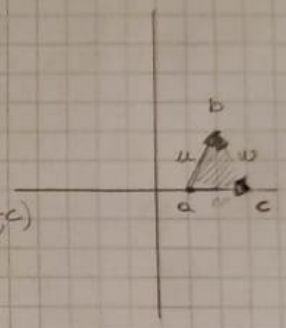
$F_{3x} = 15 \cdot \cos 210 = -12,99$ $\quad F_{3y} = 15 \operatorname{sen} 210° = -7,5$

$R_x = 8,22$ $\quad R_y = 38,71$

$$R = \sqrt{(8,22)^2 + (38,71)^2} = \boxed{39,57}$$

$$tg\, \alpha = \frac{R_y}{R_x} = \frac{38,71}{8,22} \Rightarrow \alpha = \boxed{78° 0' 41''}$$

5- $a(1,0)$ $\quad b(2,2)$ $\quad c = (3,0)$



a) $u = (b-a) = (2-1\,;\, 2-0) = (1,2)$

$v = (c-a) = (3-1\,;\, 0-0) = (2,0)$

$w = (c-b) = (3-2\,;\, 0-2) = (1,-2)$

$(-1,2)\ (b-c)$

b) $\|u\| = \sqrt{1^2+2^2} = \underline{\sqrt{5}}$

$\|v\| = \sqrt{2^2+0^2} = \underline{2}$

$\|w\| = \sqrt{1^2+(2)^2} = \underline{\sqrt{5}}$

a) $\cos \alpha = \dfrac{u \cdot v}{\|u\| \cdot \|v\|} = \dfrac{2}{\sqrt{5} \cdot 2} \Rightarrow \underline{\alpha = 63° 26' 6''}$

$\cos \beta = \dfrac{u\, w}{\|u\| \|w\|} = \dfrac{-1+4}{\sqrt{5}\sqrt{5}} = \dfrac{3}{5}$ $\quad \underline{\beta = 53° 7' 48''}$

$\delta = 180° - 63° 26' 6'' - 53° 7' 48'' = \underline{63° 26' 6''}$

c) isósceles

d) Perímetro $= l + l + l = \sqrt{5} + 2 + \sqrt{5} = \underline{6,47}$

Área $= \dfrac{1}{2} \|u\| \|v\| \operatorname{sen} \alpha = \dfrac{1}{2} \sqrt{5} \cdot 2 \operatorname{sen} 63° 26' 6''$

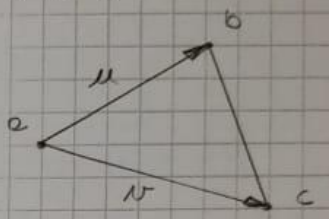
$\underline{\text{Área} = 2}$

6- $u = (-2, 0, 4)$ y $v = (5, -1, 2)$

$$u \times v = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -2 & 0 & 4 \\ 5 & -1 & 2 \\ \vec{i} & \vec{j} & \vec{k} \\ -2 & 0 & 4 \end{vmatrix} = (0\vec{i} + 2\vec{k} + 20\vec{j}) - (0\vec{k} - 4\vec{i} - 4\vec{j})$$

$$2\vec{k} + 20\vec{j} + 4\vec{i} + 4\vec{j} = 4\vec{i} + 24\vec{j} +$$

7- $a(-1, 1, 0)$ $b = (-1, 0, 4)$ y $c\ (0, 2, 2)$



$u = (b - a) = (0, -1, 4)$

$v = (c - a) = (1, 1, 2)$

$\|u\| = \sqrt{0^2 + (-1)^2 + 4^2} = \sqrt{17}$

$\|v\| = \sqrt{1^2 + 1^2 + 2^2} = \sqrt{6}$

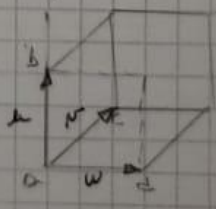
$u \cdot v = 0 - 1 + 8 = 7$

$\cos \alpha = \dfrac{u \cdot v}{\|u\| \cdot \|v\|} = \dfrac{7}{\sqrt{17}\sqrt{6}} \rightarrow 46° 7' 25''$

Area $= \dfrac{1}{2} \|u\| \|v\| \operatorname{sen} \alpha = \dfrac{1}{2} \cdot \sqrt{17} \cdot \sqrt{6} \operatorname{sen} 46° 7' 25''$

Area = 3,64

8- $a(2, -1, 1)$ $b(2, 1, 4)$ $c = (4, 3, 1)$ $d(3, -1, 0)$



$u = (b - a) = (0, 2, 3)$

$v = (c - a) = (2, 4, 0)$

$w = (d - a) = (1, 0, -1)$

NOTA

$$= \begin{vmatrix} 0 & 2 & 3 \\ 2 & 4 & 0 \\ 1 & 0 & -1 \end{vmatrix} = (0+0+0) - (12-0-4) = \boxed{|-8|}$$

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